

We Claim:

1. A method of operating a mobile node having a network layer and a plurality of network interfaces, each with a respective device driver , the method comprising the steps of:  
transmitting communications from the network layer to any of the network interfaces  
5 by way of a multi-interface driver capable of communication with the respective device driver corresponding to each respective network interface;  
switching from a first one of the network interfaces to a second one of the network interfaces by changing the one of the plurality of device drivers with which the multi-interface driver communicates, while hiding the switching from the network layer.
- 10 2. The method of claim 1, further comprising communicating between a virtual interface and the network layer by way of the multi-interface driver, the virtual interface presenting the appearance of always being an active interface to the network layer, regardless of which network interface is being used at a given time.
3. The method of claim 2, wherein the virtual interface provides a source address to the  
15 network layer to be used in data packets transmitted by the mobile node.
4. The method of claim 1, further comprising:  
selecting the second one of the network interfaces, based on a signal strength of each network interface and a user priority assigned to each network interface.
5. A method of operating a mobile node, comprising the steps of:  
20 identifying at least two available interfaces for communications by the mobile node;  
determining a plurality of characteristics of each of the network interfaces;  
selecting one of the network interfaces based on the plurality of characteristics; and  
communicating by way of the selected network interface.
6. A method according to claim 5, wherein the mobile node is communicating by way of  
25 a current network interface connection other than the selected network interface , the method further comprising:  
establishing a connection between the mobile node and the selected network interface;  
and

maintaining the current network interface connection until after the connection between the mobile node and the selected network interface is established.

7. The method of claim 5, wherein the selecting is based on a respective score for each available network interface, the score being based on a signal strength value and a user priority value.
8. The method of claim 7, wherein:  
the mobile node is currently communicating by way of a current network interface connection, and  
the score is calculated by applying a higher weight coefficient to the signal strength of the current network interface connection than a weight coefficient applied to the signal strength of any other available network interface.
9. The method of claim 7, wherein a weight coefficient applied to the user priority value for each network interface depends on the signal strength for each network interface.
10. The method of claim 9, wherein a weight coefficient of zero is applied to the user priority value for each network interface having a signal strength below a respective threshold value for that network interface.
11. The method of claim 10, wherein:  
the mobile node is currently communicating by way of a current network interface connection, and  
the threshold value for the current network interface connection is lower than the threshold value for other network interfaces.
12. The method of claim 1, further comprising:  
automatically selecting the second network interface based on predefined criteria;  
displaying an identification of the automatically selected interface;  
receiving a manual override instruction from a user identifying a selection of the second network by the user; and  
switching to the network selected by the user.

13. A method of operating a mobile node having an IPSec layer, comprising the steps of:  
establishing an IPSec session between the mobile node and a virtual private  
network/IPSec gateway by way of a first network;

switching from the first network to a second network without disturbing the IPSec  
5 session, the switching being effected using mobile IP at a lower layer than the IPSec layer;  
and

hiding the switching from the IPSec layer by providing a fake MAC layer address of a  
default router to the IPsec layer, and rewriting MAC layer headers in incoming and outgoing  
packets in an intermediate driver with correct MAC layer addresses.

10 14. A mobile node comprising:

a plurality of network interfaces, each with a respective device driver;  
a network layer;

a multi-interface driver capable of communication with each network interface by  
way of the respective device driver for that network interface, the multi-interface driver  
15 handling communications from the network layer to any of the network interfaces;

the multi-interface driver switching from a first one of the network interfaces to a  
second one of the network interfaces by changing the one of the plurality of device drivers  
with which the multi-interface driver communicates, while hiding the switching from the  
network layer.

20 15. The mobile node of claim 14, further comprising a virtual interface in communication  
with the network layer by way of the multi-interface driver, the virtual interface presenting  
the appearance of always being an active interface to the network layer, regardless of which  
device driver is being used at a given time.

16. The mobile node of claim 15, wherein the virtual interface provides a source address  
25 to the network layer to be used in data packets transmitted by the mobile node.

17. The mobile node of claim 14, further comprising:

means for selecting the second one of the network interfaces, based on a signal  
strength of each network interface and a user priority assigned to each interface.

18. A mobile node, comprising:

at least two available network interfaces for communications by the mobile node;  
interface detection means for determining a plurality of characteristics of each of the  
network interfaces;

means for selecting one of the network interfaces based on the plurality of  
5 characteristics,

wherein the mobile node communicates by way of the selected network interface.

19. The mobile node of claim 18, wherein the selecting means selects one of the network  
interfaces based on signal strength and a user defined preference value.

20. The mobile node of claim 18, wherein the selecting means includes hysteresis.

10 21. A mobile node, comprising:

a network layer;

an IPSec driver below the network layer;

an intermediate driver below the IPSec driver;

15 at least one network interface to and from which the intermediate driver sends and  
receives packets,

wherein the intermediate driver includes means for switching from a first network to a  
second network, without disturbing an ongoing IPSec session, the switching being effected  
using mobile IP at a lower layer than the IPSec layer, and

20 the intermediate driver hides the switching from the IPSec layer by providing a fake  
MAC layer address of a default router to the IPsec layer, and rewrites MAC layer headers in  
incoming and outgoing packets with correct MAC layer addresses.

22. A computer readable medium encoded with computer program code, wherein, when  
the code is executed by a processor, the processor performs a method of operating a mobile  
node having a network layer and a plurality of network interfaces, each with a respective  
25 device driver, the method comprising the steps of:

transmitting communications from the network layer to any of the network interfaces  
by way of a multi-interface driver capable of communication with the respective device  
driver corresponding to each respective network interface;

switching from a first one of the network interfaces to a second one of the network interfaces by changing the one of the plurality of device drivers with which the multi-interface driver communicates, while hiding the switching from the network layer.

23. A computer readable medium encoded with computer program code, wherein, when the code is executed by a processor, the processor performs a method of operating a mobile node, comprising the steps of:

identifying at least two available network interfaces for communications by the mobile node;

determining a plurality of characteristics of each of the network interfaces;

selecting one of the network interfaces based on the plurality of characteristics; and communicating by way of the selected network interface.

24. A computer readable medium encoded with computer program code, wherein, when the code is executed by a processor, the processor performs a method of operating a mobile node having an IPSec layer, comprising the steps of:

establishing an IPSec session between the mobile node and a virtual private network/IPSec gateway by way of a first network;

switching from the first network to a second network without disturbing the IPSec session, the switching being effected using mobile IP at a lower layer than the IPSec layer; and

hiding the switching from the IPSec layer by providing a fake MAC layer address of a default router to the IPsec layer, and rewriting MAC layer headers in incoming and outgoing packets in an intermediate driver with correct MAC layer addresses.

25. A method of selecting a Wi-Fi network from a plurality of Wi-Fi networks, each Wi-Fi network having an associated ESSID, the method comprising the steps of:

receiving an input indicating a selection of a complete ESSID, an ESSID prefix, or a request for any available Wi-Fi network; and

automatically selecting:

the Wi-Fi network associated with the complete ESSID, if the input indicates the complete ESSID,

one of the Wi-Fi networks associated with an ESSID having the ESSID prefix if the input indicates selection of the ESSID prefix, or

one of the available Wi-Fi networks if the input indicates a request for any available Wi-Fi network,

wherein the automatic selecting step is based on at least one of the group consisting of signal strength in each Wi-Fi network, priority of each Wi-Fi network, number of clients in  
5 each Wi-Fi network, and frame error rate in each Wi-Fi network, if the input indicates selection of the ESSID prefix or any available Wi-Fi network.

26. The method of claim 25, wherein the input is one of the group consisting of data from a profile configuration and data manually entered by a user.